

# Intel<sup>®</sup> Embedded Graphics Drivers and Video BIOS v6.1

Software Product Specification

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*December 2006*



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## Revision History

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Date	Revision	Description
December 2006	005	Updated for Release 6.1 of the IEGD. Change bars indicate areas of change.
September 2006	004	Updated for Release 6.0 of the IEGD. Change bars indicate areas of change.
June 2006	003	Updated for Release 5.1 of the IEGD. Change bars indicate areas of change.
February 2006	002	Updated for Release 5.0 of the IEGD.
June 2005	001	Initial release.



## 1.0 Product Context

The Intel® Embedded Graphics Drivers specifically target the needs of embedded platform developers, offering a robust alternative to drivers designed for the desktop and mobile market segments. With a flexible architecture extending to the video BIOS, this driver set facilitates rapid customer time-to-market by allowing OEMs and system integrators to customize their configurations in-house, while maintaining a competitive performance profile.

Intel Embedded Graphics Drivers have been validated on specific Linux\* and Microsoft Windows\* operating systems and support a variety of operating systems on the following Embedded Intel® architecture-based chipsets:

- Intel® Q965 Express chipset
- Mobile Intel® 945GM Express chipset
- Intel® 945G Express chipset
- Mobile Intel® 915GM Express chipset
- Intel® 915GV chipset
- Intel® 855GME chipset
- Intel® 852GME chipset
- Intel® 852GM chipset
- Intel® 845GV chipset

### 1.1 Intel® Dynamic Display Configuration Technology

This new technology from Intel allows embedded customers to expand usage models beyond typical desktop and laptop configurations through numerous advanced display configuration capabilities, including:

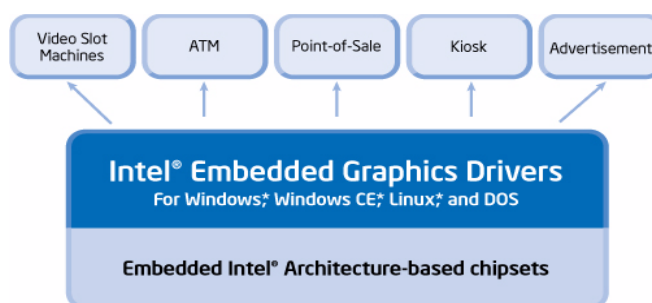
- Multi-display using any combination of available display ports
- Dynamic display detection and enablement according to configurable display port order
- Simplified specification of customized flat-panel timings
- Use of EDID data for panels on the integrated LVDS port
- Setup of conditional behavior when EDID and/or non-EDID panels are detected
- Advanced configuration for clone display mode on different sized displays
- Use of integrated display ports in conjunction with PCI-based graphics cards
- Ability to display POST messages and boot to DOS in clone display mode (VESA modes only)

### 1.2 Cross-Platform Feature Consistency

Intel Embedded Graphics Drivers feature a modular architecture which enables similar functionality across all supported Intel® platforms and operating systems. This reduces time-to-market through customer familiarity and ease of portability to future integrated graphics chipset products. Designed for embedded market segments, these drivers provide features specific to the needs of embedded platform developers, while maximizing configuration flexibility.

Intel Embedded Graphics Drivers support a wide range of applications including, but not limited to:

- Point of Sale (POS) systems running desktop Microsoft Windows XP\*, using dual independent displays to dual LVDS flat-panel displays
- Kiosk systems running Microsoft Windows XP Embedded, using dual independent displays to single CRT and single DVI flat-panel displays
- ATM systems running Microsoft Windows XP Embedded, using a single display to LVDS flat-panel display
- Set Top Box running Red Hat Linux, using a single display to HDTV display
- Video slot machines running Microsoft Windows XP Embedded, using a single display to CRT display
- Advertisement systems running Red Hat Linux, using a single display to 16:9 wide-screen VGA plasma display



For further product information, please visit the Intel Developer Web site at

<http://www.intel.com/go/iegd>

Please note that the *Intel Embedded Graphics Drivers and Video BIOS User's Guide* provides in-depth product information.

**Table 1. IEGD Features**

Features	Benefits
Consistent feature set	Easy portability across Intel's integrated product families and across operating systems; target chipsets have the same capabilities regardless of original "desktop" or "mobile" usage model
Configuration EDitor (CED)	Graphical pre-installation utility allows easy creation of consolidated driver installation packages for Windows CE*, Windows*, Linux* and VBIOS across numerous platforms and display combinations
Microsoft Direct3D* support	Faster rendering of 3D images; available on Intel® 845 through 945 series chipsets
Render Scaling	Enables support of any one of the standard modes (640 x 480, 800 x 600, 1024 x 768 or 1280 x 1024) as a drawable framebuffer size output to a native panel and connected via a port encoder that doesn't hardware-scale
Rotation for Microsoft Windows CE	Enables rotation of the display 0°, 90°, 180°, 270°
Support for three displays	Support for two onboard displays and a third via a PCI add-in video card
Serial DVO device support	A universal serial DVO port driver for use with the Intel® 915GV Express, Intel 915GM Express, Intel 945G Express, Mobile Intel 945GM Express, and Intel Q965 Express chipsets
DVO device support	Allows selection of a variety of DVO devices (TMDS, LVDS, or TV-Out) in the combinations that can be supported by hardware, including Gang DVO



Table 1. IEGD Features (Continued)

Features	Benefits
DVO device extensibility	Software Development Kit allows addition of customized DVO devices (those not commonly supported by default)
Configurable display support	Exposes method for adding new or custom display modes
Control APIs	Non-standard features exposed, such as display switching and toggling, and DVO device control
Boot configurability	Driver and Video BIOS may be customized specifically for OEM display and platform configurations
2D acceleration	Improved performance of applications that take advantage of OS acceleration APIs, such as the X11 XAA interface or Microsoft DirectDraw* interface
Overlay support	Improved video playback performance using the X11 Xv interface or Microsoft DirectDraw interface
Multiple-display support	Separate data may be sent to separate displays where supported by hardware (such as the Intel® 855GME GMCH chipset); otherwise, supports same data sent to separate displays
ACPI on Microsoft Windows*	Advanced configuration and power interface
Microsoft Direct3D* Support	Improved performance for 3D applications utilizing DirectX* APIs for Windows* operating systems
OpenGL for Linux	Provides OGL support for advanced 3D capability: OGL 1.4 on Intel® 915GV Express, and OGL 1.3 on Intel 845GV, Intel 852GM, Intel 852GME, and Intel 855GME GMCH chipsets
Upscaling	Lower-resolution modes can be displayed full screen with configurations that support upscaling (CH7017*, CH7308*, etc.)
Embedded O/S support	Validated for embedded-focused operating systems: Windows* XP Embedded, Windows Embedded Point of Service (WEPOS), plus Windows CE, Windows XP, Linux (including Fedora Core 5* and Damn Small Linux* (DSL))



## 2.0 Product Specification

The Intel® Embedded Graphics Drivers offer the following **driver features**:

- Support for the Intel® Q965 Express chipset (2D support only)
- Intel® Embedded Graphics Drivers (IEGD) Configuration Editor (CED)
- D3D support
  - v6.1 adds support for Mobile Intel® 945GM Express and Intel® 945G Express chipsets
- Support for three displays — two onboard and a third via a PCI add-in video card
- Render Scaling
- Rotation support for Microsoft Windows CE\*
- Dual Digital Transmitter support on Serial DVO
- Enhanced Clone mode support for use with different-sized displays
- Ability to use PCI-based graphics as the primary display and integrated graphics as the secondary display
- Ability to configure port names used in the runtime graphical user interface (GUI)
- Ability to change resolution/refresh rates for clone displays in the runtime GUI
- Expanded 2D Acceleration in Microsoft Windows CE\* (4.2 and 5.0)
- Advanced Extended Display Identification Data (EDID) Configuration (VESA version 1.3)
- Auto-enable bus mastering
- Installer/De-installer (Microsoft Windows\* only)
- Display modes (GUI): (Microsoft Windows and Linux only)
- Full ACPI Support on Microsoft Windows XP and 2000 (not available on Microsoft Windows CE)
- Display Discovery and Initialization (driver only)
- Dual DVO through single device (e.g., CH7017\*)
- Dynamic port driver
- Partial ACPI Standby support
- Ability to set port as inactive
- Dual digital display output support
- Universal .inf file for Multiple Platform Configuration (Microsoft Windows only)
- Dynamic mode support using EDID information
- Multi-refresh, multi-resolution support
- Rotation and inverted display
- Allows manual specification of display timing sets
- EDID-less (non-EDID-compliant) display support
- Multiple independent displays (Microsoft Extended Desktop, XFree86 Xinerama\*)
- Clone dual-display support
- Twin dual-display support

Intel® Embedded Graphics Driver offers the following **VBIOS features**:





- Embedded Intel® Architecture chipset support
- Legacy VBIOS and 3.4 VBIOS backwards compatibility
- DVO and sDVO transmitter support
- Improved User Build System
  - Tools and utilities for building of the VBIOS option ROM
- Expanded support for dual-display configurations
- Display Discovery and Initialization
- Full VESA support mode
- POST to internal LVDS and DVO/sDVO
- Full VGA modes support

Intel® Embedded Graphics Driver offers the following **digital display features**:

- Internal LVDS
- Chronitel: CH7009A\*, CH7009B\* (DVI + TV)
- Chronitel: CH7301\* (DVI)
- Chronitel: CH7305\* (LVDS)
- Chronitel: CH7307\* Serial DVO (DVI)
- Chronitel: CH7308\* Serial DVO (LVDS)
- Chronitel: CH7310\* (DVI + TV)
- Chronitel: CH7317\* (LVDS + TV)
- Focus: FS453\*, FS454\* (TV)
- National Semiconductor: NS2501\* (LVDS)
- National Semiconductor: NS387R\* (LVDS)
- Silicon Image: SiI164 CR64\* (DVI), SiI164 CTG64\* (DVI)
- Silicon Image: SiI1362\* (SDVO), SiI1364\* (SDVO)
- Texas Instruments: TFP410\* (DVI)
- THine: THC63DV164\* (DVI)

Intel® Embedded Graphics Driver offers the following **operating system and API features**:

- Direct 3D\* (DirectX\* 8.1, DirectX 9.0)
- DirectDraw (DirectX 8.1, DirectX 9.0, DirectX 3)
- DOS\* Support (IBM PC DOS 2000\*, Microsoft DOS 6.22\*)
- Linux\* support
  - Damn Small Linux\*
  - Fedora Core 2\* (Kernel 2.6 and X.org)
  - Fedora Core 5\*
  - OpenGL for Linux
  - Red Hat 9 Linux\* (2.4.20-8 Kernel)
  - Red Hat 9 Linux\* (2.4.24 Kernel)
  - SUSE Enterprise Server (SLES) 9 and 10 Linux



- Microsoft DirectX API Runtime (DirectX 8.1 SDK samples in windowed and full-screen modes)
- Microsoft Windows support
  - Microsoft Windows 2000\*, English (SP4)
  - Microsoft Windows 2000, Japanese, Traditional Chinese, Korean
- Microsoft Windows CE support
  - Microsoft Windows CE 4.2
  - Microsoft Windows CE 5.0 (DirectDraw\* only)
- Microsoft Windows Embedded for Point of Service (WEPOS\*)
- Microsoft Windows XP\* support
  - Microsoft Windows XP, English (SP2)
  - Microsoft Windows XP, Japanese, Traditional Chinese, Korean
- Port Driver Software Development Kit (Microsoft Windows and Linux only)
- Runtime operation API
- Support for default VGA modes
- Vertical Extended Display support (Microsoft Windows CE 4.2 and 5.0 only)